

NEW SPECIES AND A NEW GENUS OF MICRO-CADDISFLY FROM NORTHERN AUSTRALIA, INCLUDING THE FIRST AUSTRALIAN RECORD OF THE TRIBE STACTOBIINI (TRICHOPTERA: HYDROPTILIDAE)

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Summary

WELLS, A. (1990) New species and a new genus of micro-caddisfly from northern Australia, including the first Australian record of the tribe Stactobiini. *Trans. R. Soc. S. Aust.* 114(3), 107-128, 30 November, 1990.

Twenty-two further species are recognised in the Australian Hydroptilidae, all from northern Australia and, with the exception of *Oxyethira bogambara*, all newly described. For the first time a stactobiine species (in *Chrysotrichia*) is recorded and also a new monotypic genus, *Jabitrichia* gen. nov., probable sister group to *Oxyethira*. Other new species include two in *Oxyethira*, six in *Hellyethira*, two in *Acritoptila*, one in *Orphninothrichia* and eight in *Orthotrichia*. Information is given on immatures of several species, some new and others established. For the latter, new data on ranges also are supplied.

KEY WORDS: Taxonomy, Trichoptera, Hydroptilidae, Stactobiini, Northern Australia, new genus

Introduction

The basic composition of the Australian Hydroptilidae (Trichoptera) appeared to be known until recent intensive collecting in northern Australia revealed several new elements, as well as more species in established groups. Now, an Oriental-New Guinean genus in a tribe hitherto unknown in Australia and a new monotypic genus are reported. Both represent significant additions to the fauna.

Wells (1986¹) commented on the relatively restricted nature of Australian Hydroptilidae, apparently comprising only two Hydroptilinae tribes, Hydroptilini and Orthotrichiini. Several genera in the tribe Stactobiini were known from SE Asia, but none from Australia or New Guinea. More recently, three stactobiine genera have been reported from New Guinea (Wells 1990b), and now a species in *Chrysotrichia* Schmid is described from NE Australia.

Another new species from northern Australia keys to *Hydroptilla* Dalman with which it shares the derived features (Wells 1986¹) of tibial spur formula 0,2,4, and ocelli absent. Yet in general wing shape and venation, form of male and female genitalia, and presence of abundant *sensilla auriculica* on antennal segments of males, it more closely resembles members of *Oxyethira* Eaton, which has three ocelli and usually tibial spurs 0,3,4. Arguments are given for the establishment of a new genus, perceived as the sister group of *Oxyethira*, and the presence of this taxon is discussed in

relation to representation of *Oxyethira* subgenera in Australia.

Among others described in this paper, is a species in *Orphninothrichia* Mosely, an endemic genus previously unknown to the northwest of the Great Dividing Range, although common and diverse in the southeast and occurring in the south-central region. A torrenticolous group, it is probably not surprising to find a member, possibly a component of a relictual Gondwanan fauna, in a small monsoon forest stream at the foot of the Kakadu Escarpment. From this same locality, a species is referred to *Oxyethira* (*Trichoglene*), the most primitive of the *Oxyethira* subgenera; it most closely resembles a New Caledonian species, *Oxyethira insularis* Kelley.

Additional to the above, are a second and highly irregular new species in *Oxyethira*, and the first Australian records of the widespread Oriental *O. bogambara* Schmid. Descriptions are given also of new species in the almost-cosmopolitan *Orthotrichia* Eaton, and in the Australian-E Asian *Hellyethira* Neboiss, genera which together comprise more than half the Australian hydroptilid fauna; and two new species are referred to the Australian-New Caledonian genus, *Acritoptila* Wells. Information on immatures is supplied when available, and is included for several established species, previously unknown from larvae and/or pupae. Ranges of these species are extended.

Twenty-one new species are described, and with *O. bogambara*, they raise the Australian Hydroptilidae to 121; tribal representation increases to three, all in the subfamily Hydroptilinae. Compared with about 340 species in all other trichopteran families in Australia (Neboiss 1988), hydroptilids appear extraordinarily well represented. However, work in progress on other families (e.g.

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¹ Wells, A. (1986) The systematics and biogeography of the Australian Hydroptilidae (Trichoptera). Ph.D. thesis, University of Adelaide (unpubl.).

Ecnomidae, Leptoceridae, and Hydropsychidae: Cartwright, Neboiss, St Clair & Dean in prep.) will shift the emphasis and result in a more realistic picture of the fauna.

Materials and Methods

Methods follow those of Wells (1979a, 1990a). All holotypes and some paratypes were prepared as permanent slide mounts in Canada balsam.

Material studied includes light trap collections from Yuccabine Creek, NE Queensland (Benson & Pearson 1988), and Alligator Rivers region, Northern Territory, collected from 1985–1989. Samples of immatures were collected from the latter area, and for several species larvae have been associated with adults using pharate adults, larval exuviae and cases. Reappraisal of Benson & Pearson's (1988) material has resulted in changes to several identifications and these are indicated for the species involved. One new species from NW Western Australia is described.

No keys to genera or species are given as this is essentially a miscellaneous set of species.

Depositories are abbreviated as follows:

Museum of Victoria, Melbourne (NMV); Museum and Art Galleries of the Northern Territory, Darwin (NTM); National Museum of Natural History, Washington, DC, (USNM); West Australian Museum (WAM).

Systematics

Chrysotrichia Schmid

Chrysotrichia Schmid, 1958, p. 54. Type species: *Chrysotrichia hamagata* Schmid, by original designation.

Chrysotrichia ranges from Pakistan to New Guinea (Wells 1990b) and has been collected from beside slow, lowland streams (Schmid 1958) and faster first order streams (Wells 1990a, 1990b); larvae have been collected from rocks in streams. *Chrysotrichia australis* sp. nov. closely resembles *C. iomara* Wells from the Central and East Highlands provinces of New Guinea (Wells 1990b) and probably evolved from relatively recent emigrants to Australia.

Chrysotrichia australis sp. nov.

FIG. 1

Holotype: NMV, ♂, NE Qld, Yuccabine Creek, 1.1986, R. G. Pearson & L. J. Benson.

Diagnosis: Closely resembling *C. iomara* in form of male genitalia, but distinguished by inferior appendages more attenuate apically, and dorsal plate with a V-shaped apical cleft.

Description: Male. Anterior wing length, 1.3 mm. Genitalia, Fig. 1. Segment IX short. Dorsal plate elongate, longer than inferior appendages, a V-shaped cleft apically. Aedengus slender, with paired spines apico-laterally. Inferior appendages broad-based, attenuate apically. Female and immatures unknown.

Distribution: Known only from the type locality, northeastern Qld.

Etymology: From the Latin – *australis* – southern, being the southern-most occurrence of the genus.

Jabitrichia gen. nov.

Type species: *Jabitrichia dostinet* gen. et sp. nov.

A new genus is erected to accommodate a species otherwise requiring considerable modification of the generic definitions of *Hydroptila* or *Oxyethira*, with each of which it shares some derived characters.

Jabitrichia gen. nov. shares with *Hydroptila* the apomorphic states of ocelli absent and tibial spur formula 0,2,4, as well as pattern of wing colour and form of thoracic scutellae. The long antero-lateral apodemes on abdominal segment IX, seen in male *Jabitrichia* gen. nov., are found in the Holarctic *lineoides* group in *Hydroptila* (Marshall 1979), although not in other groups. Yet, wings strongly attenuated, forewing without jugal lobe, antennal segments with dense *sensilla auricillica*, female genitalia in form of a modified oviscap, and particular reductions of male genitalic structures are apomorphies uniting the new genus with *Oxyethira*: spur formula 0,2,4 and aedeagus without titillator occur in some *Oxyethira*, although not together. The rounded or triangular forward projection of the antero-ventral margin of abdominal segment IX of males and the uniquely flask-shaped case of larva and pupa are autapomorphies of *Oxyethira* – as yet immatures of the new genus are unknown.

Spur number and presence of ocelli seem to be labile characters in Hydroptilidae, and in a somewhat different situation, with an ocelli-less New Guinean species which otherwise conforms with *Scelotrichia* Ulmer, I argued against establishing a separate genus (Wells 1990b). With this present species and *Hydroptila*, however, the synapomorphies are probably homoplastic. The closer association, indicated by sharing of derived states of more conservative characters, is thus with *Oxyethira*, and since several autapomorphic conditions can be recognised in each taxon, a new genus is erected.

Examination of characteristics of sub-genera in *Oxyethira* (see Kelley 1984) reveals resemblances between members of *O. (Dichoglene)* and

Jabirichia dostinei gen. et sp. nov. in general form of male genitalia. In lateral view, abdominal segment IX of each is similar in shape, although in ventral view the anterior margin of the segment is modified in *Oxyethira* while *Jabirichia* is closer to the primitive form for the family. According to Kelley (1984), some members of *O. (Trichoglene)* have lost the titillator on the aedeagus and in others it is present as a vestigial rod. The elaborately curved spine associated with the aedeagus of *Jabirichia* gen. nov. may be derived from the titillator.

O. (Trichoglene), the most primitive sub-genus in *Oxyethira* (Kelley 1984), is Australasian, occurring mainly in southern and eastern Australia, and in New Zealand and New Caledonia (Kelley 1989). A new species in this subgenus, *O. cornutata* sp. nov. described here from the Alligator Rivers Region in the north, most closely resembles a species from New Caledonia; this is the species in what I believe is a relictual fauna in the small monsoon forest stream. All other *Oxyethira* to the west of the dividing range in northern Australia are in the relatively highly derived *O. (Dampftrichia)*, several ranging from SE Asia through New Guinea to Australia. I have suggested previously (Wells 1987) that *O. (Trichoglene)* probably evolved in Gondwanaland and that in Australia *O. (Dampftrichia)* represents a relatively recent arrival from the Oriental region. *Jabirichia* gen. nov. appears to be the sister group of *Oxyethira*, surviving in northern Australia in what could well have been the habitat (Wells 1987) of their common ancestor - the warm, macrophyte-rich billabong that seasonally becomes a slow-flowing, warm stream. With the initial dichotomy, the ancestor of *Oxyethira* may have invaded cooler, faster-flowing systems.

Diagnosis: A sister group to *Oxyethira*, but differing in absence of ocelli, and in the male having slender anterior apodemes on segment IX.

Description: Adults. Head (Fig. 3) without ocelli, tentorium complete, tentorial arms reduced to fine threads medially, antennae of male with basal whorl of fimbriate hair and dense *sensilla auricillica* on flagellar segments. Thorax (Fig. 3) with mesoscutellum convex anteriorly, metascutellum triangular; tibial spur formula 0,2,4; wings narrow, attenuate apically, vestiture fuscous anteriorly, pale cream posteriorly, anterior wing without jugal lobe, with fork 2 only (Fig. 2). Male genitalia: no mesal process on segment VII; segment IX short dorsally, with slender antero-lateral apodemes produced forwards (of form seen in *Stactobiini*), posterior margin forming stout lateral processes; dorsal plate (tergite X) and subgenital plates absent; aedeagus without titillator (may be represented by curved, elongate spine). Female genitalia a modified

oviscapt (as in *Oxyethira*); bursa copulatrix stoutly rounded.

Immatures unknown.

Comments: Known only from a single species collected at lights beside the slow-flowing inlet to a large, shallow billabong that supports a rich growth of macrophytes, northeastern N.T.

Etymology: Derived from Jabiru, the name of the township near the collecting locality.

Jabirichia dostinei gen. et sp. nov.

FIGS 2-7

Holotype: NTM, ♂, N.T., Gulungul Creek at inlet to Gulungul Billabong, 12°38'S, 132°53'E, 17.v.1988, Lt Tr., A. Wells & P. Suter.

Paratypes: N.T.: NTM, ♀ (allotype), collected with holotype; NTM, NMV, 6 ♂♂, same loc., 11.iv.89, Wells & Suter; NMV, 1 ♂, Jabiru, Ranger Retention Pond 1, 20.v.88, Wells & Suter.

Diagnosis: As for the genus.

Description: Medium sized; pale, fuscous and cream. Male (Figs 2,3, 5-7). Anterior wing length, 1.8 mm. Antennae 32-segmented, segments elongate. Genitalia, Figs 5-7. Sternite IX about as long as wide, retracted within segment VIII; postero-lateral processes on segment IX stout, curved inwards, truncate apically; antero-lateral apodemes elongate, produced forwards into segment VI. Paired small sub-triangular ventro-lateral structures probably represent inferior appendages. Aedeagus swollen basally, constricted medially and expanded in distal half, a complex spine arises mesally, extends beyond apex to curve sharply anteriorly. Female. Length of anterior wing, 2.1 mm. Antennae 21-segmented, segments without *s. auricillica*. Genitalia, Fig. 4. Terminalia stout. Sternite IX broadly rounded posteriorly. Bursa copulatrix stout.

Immatures unknown.

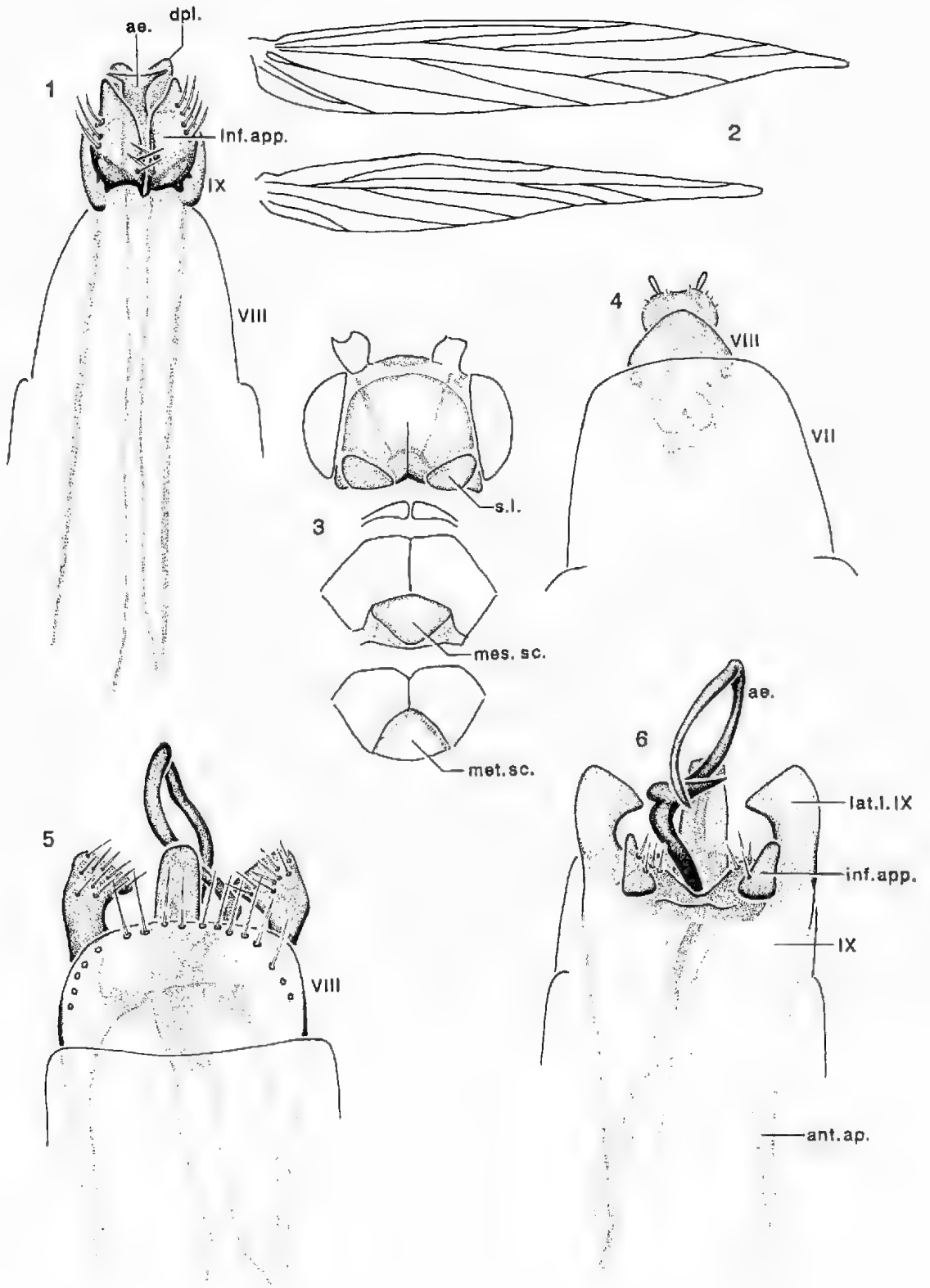
Distribution: Known only from the type locality and a macrophyte-rich settling pond, Alligator River's region, N.T.

Etymology: Named for P. Dostine who collected litres of other caddisflies.

Orphnino-trichia Mosely

Orphnino-trichia Mosely, 1934, p. 138; Mosely & Kimmins 1953, p. 510; Wells 1980, n. 628, 1985b, p. 644. Type species: *Orphnino-trichia maculata* Mosely, by original designation.

Nine species in this endemic genus have been described previously. The type species, *Orphnino-trichia maculata*, is widespread from south-central S.A., Tas., E Vic. to SE Qld. All others appear to be narrowly distributed although their



lack of attraction to light may have led to a false impression of their distributions. One species is recorded from Atherton Tableland in NE Qld (Wells 1980) but none from W.A. The new species is the first found west of the Great Dividing Range, and is probably part of a relictual Gondwanan fauna in the small, spring-fed stream at the base of the Kakadu Escarpment. No larvae have been collected, but as all others conform with that of *O. maculata* this new species is expected to be similar.

Orphniaotrichia originis sp. nov.
FIGS 8-9

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 18-19.v.1988, Lt Tr., A. Wells & P. Suter.

Paratypes: NTM, ♀ (allotype), collected with holotype; NTM, NMV, 2 ♂♂, 4 ♀♀, same loc., 14.iv.89, Suter & Wells.

Diagnosis: Quite dissimilar to congeners; male distinguished by dorsal plate deeply cleft apically. Females lack the ventral abdominal glands seen in other species.

Description: Adults. Uniformly dark grey, small. Male. Anterior wing length, 1.6 mm. Antennae 18-segmented, terminal segments pale, rest dark. Genitalia, Fig. 8. Segment IX produced posterolaterally to form lobes, each with a short inner ventral process; sternite deeply excavated. Dorsal plate membranous, deeply cleft apically. Subgenital plate tapered, apex rounded, sclerotised. Inferior appendages sub-triangular, bases separated widely by paired sclerotised processes, apices converging. Aedeagus of usual shape; elongate, slender, dilated towards rounded apex, tirillator near base. Female. Anterior wing length, 1.5 mm. Antennae 17-segmented. Genitalia, Fig. 9. Segment VIII elongate, tapered distally. Terminal segments narrow, no prominent gland on abdominal sternite VII. Immatures unknown.

Distribution: Known from type locality only, Kakadu National Park, northern N.T.

Etymology: From the Latin -*originis* - source, in reference to the likely relictual nature of this and other components of the fauna of the type locality.

Hellyethira Neboiss

Hellyethira Neboiss, 1977, p. 42; Wells 1979b, p. 312; 1983, p. 632. Type species: *Xuthotrichia simplex* Mosely, by original designation.

Six new species are described, two from the Alligator Rivers region, three from Yuccabine Creek and one from northwestern W.A. Males of *H. radonensis* sp. nov., *H. forficata* sp. nov., and *H. naumanni* sp. nov. resemble members of the *eskensis* group, a distinct lineage amongst Australian *Hellyethira* (Wells 1979b), and *H. imparilobata* sp. nov. and possibly *H. quadrata* sp. nov. are in the *malleoforma* group. I am unable to place the highly irregular *H. spinosa* sp. nov. (here tentatively placed in *Hellyethira*), in any of the existing species groups. Its male genitalic parts are modified to form a set of complex and irregular spines and lobes. Three strongly asymmetric species occur in New Guinea (Wells in prep.), but all are distinct from *spinosa* sp. nov.; its immatures are unknown.

These six new species increase to 23 the number of Australian *Hellyethira*. In addition, four are known from New Guinea, one each from Sulawesi and Japan; one Australian species has been collected in New Caledonia.

Hellyethira forficata sp. nov.
FIGS 10, 45

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 18.v.1988, A. Wells & P. Suter.

Paratypes: NTM, 1 ♂, same loc. as holotype, 18-19.v.88, Wells & Suter; NTM, 4 ♂♂, Graveside Creek, 18.vii.88, P. Dostine.

Other material examined, N.T.: NTM, larvae, pupae, Radon Springs, 18.v.88, Suter & Wells; larvae and pupae, Koolpia Creek, 13°29'S, 132°35'E, 25.v.88, Suter & Wells, OSS voucher set.

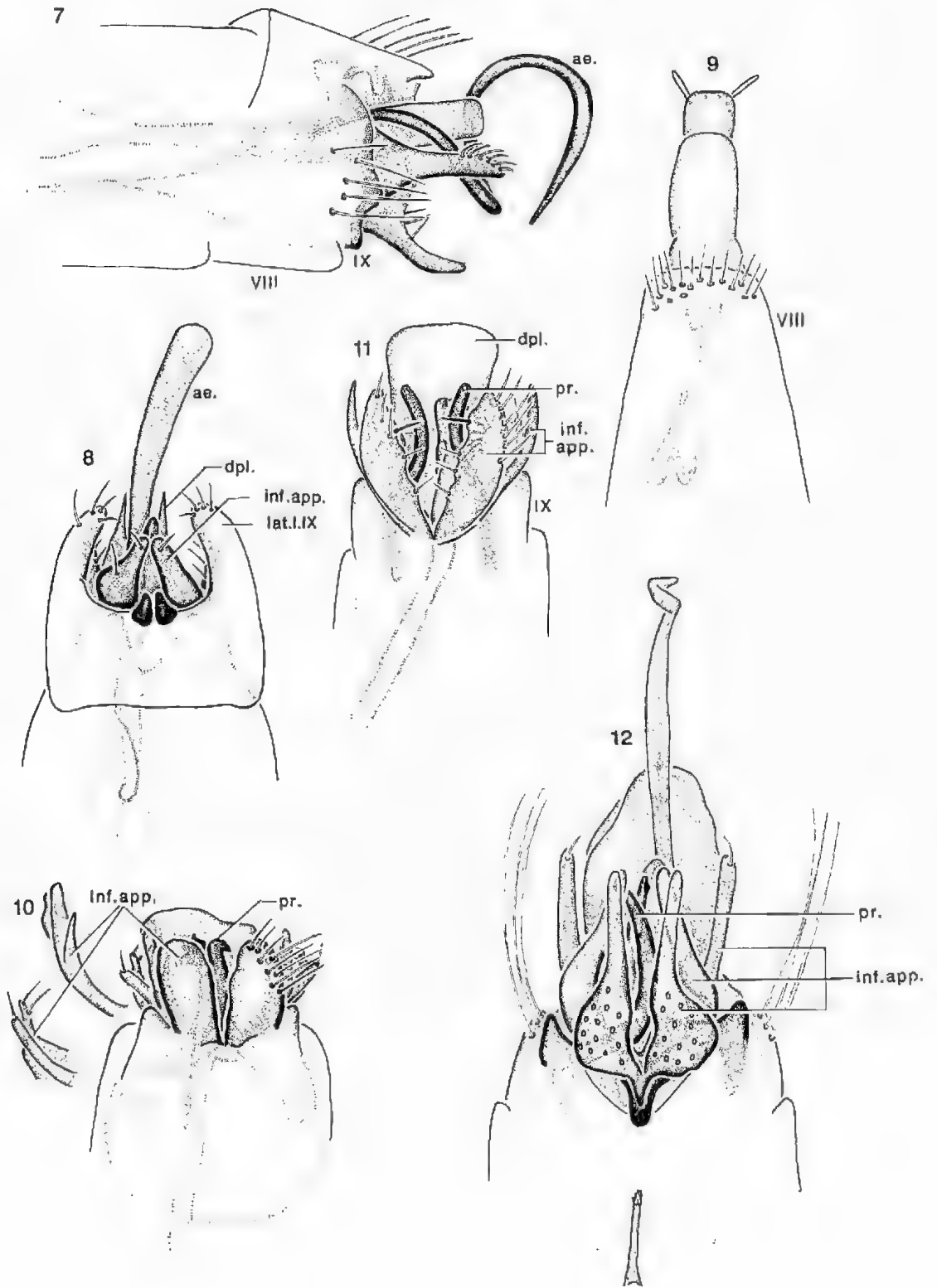
Diagnosis: In the *eskensis* group and most closely similar to *H. radonensis* sp. nov. Differing in parameres hooked sub-apically, apices acute; dorsal plate without spines or spinules.

Description: Male. Vestiture mottled, fawn-brown. Anterior wing length, 1.8 mm. Antennae 32-segmented. Genitalia, Fig. 10. A slender, apically-acute mesal process on sternite VII. Segment IX broadly rounded anteriorly in ventral view, postero-lateral margins produced in short triangular lobes, apical margin concave. Dorsal plate stout throughout length, membranous, without spines or spinules. Subgenital plate not seen. Inferior appendages with a broad, irregularly-

Fig. 1. *Chrysootrichia australis* sp. nov. 1, male genitalia, ventral view.

figs 2-6. *Jabirtrichia dostinei* sp. nov. 2, male wings; 3, male, dorsal head and thorax; 4, female genitalia, ventral view; 5, 6, male genitalia, dorsal and ventral views.

Abbreviations: ae, aedeagus; ant. ap., anterior apodeme; dpl., dorsal plate; inf. app., inferior appendages; lat. 1, IX, lateral lobe of segment IX; mes. sc., mesoscutellum; met. sc., metascutellum; s.l., setal lobe; VII, abdominal segment VII; VIII, abdominal segment VIII; IX, abdominal segment IX.



shaped ventral lobe and four slender lobes posteriorly. Parameres scissor-like, hooked sub-apically, apices acute. Aedeagus slender, elongate, constricted slightly at about $\frac{2}{3}$ length. Female unknown. Mature larva pale. Case (Fig. 45) purse-shaped, valves constructed of fine sand with distinct dorsal and ventral margins, ends rounded, a shallow concavity dorsally in which a large sand grain is attached.

Distribution: Northern N.T., larvae collected from streams.

Etymology: From the Latin -*forficatus* - scissor-shaped, describing the parameres.

Hellyethira radonensis sp. nov.

FIG. 11

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 18-19.v.1988, Lt Tr., A. Wells & P. Suter.

Paratypes: N.T.: NTM, 2 ♂♂, same loc., 14.iv.89, Suter & Wells; NMV, 1 ♂, same loc., 13-14.iv.89, Suter & Wells; NMV, 1 ♂, Magela Creek, at Ranger outlet pipe, 23.v.88, Wells & Suter; NTM, 1 ♂, Bower Bird Billabong at outlet, 12°47'S, 133°02'E, 1.x.88, Dostine.

Diagnosis: Closely resembling *H. veruta* (Wells 1985a) but males distinguished by the form of the base of the parameres which align with the body, rather than laterally; the digitiform, setate processes above the inferior appendages; and the additional upper lobe on inferior appendages with long setae on inner margin.

Description: Adults. Male. Anterior wing length, 1.9-2.0 mm. Antennae 33-segmented. Genitalia, Fig. 11. A slender, elongate mesal process on sternite VIII. Sternite IX roundly excavated apically. Dorsal plate broad throughout length, expanded distally, apical margin rounded, without spines or spinules. Subgenital plate not apparent. Inferior appendages multi-lobed: ventral lobe with outer margin broadly rounded, inner margin crenulate; dorsal lobe narrower, with a tuft of long setae sub-apically on inner margin; laterally a long, slender lobe without apical seta, and a shorter slender lobe with an apical seta. Parameres slender, loosely S-shaped, not overlapping, apices rounded. Aedeagus with a swollen membrane apically and twisted sclerotised process.

Female and immatures unknown.

Distribution: N.T., Kakadu National Park, Radon Springs and upper Magela Creek.

Etymology: Named for the type locality.

Hellyethira naumanni sp. nov.

FIGS 12-13, 17

Holotype: NMV, ♂, W.A., Charnley River, 2 km SW Roly Hill, CALM Site 25/2, 16-20.vi.1988, I. D. Naumann.

Paratypes: NMV, 7 ♂♂, 1 ♀ (allotype), collected with holotype.

Diagnosis: An *eskensis*-group species differing from others in having all male genitalic parts slender and elongate distally; female resembles *H. vernoni* Wells.

Description: Male. Anterior wing length, 1.9-2.0 mm. Antennae 32-segmented. An elongate, slender mesal process on sternite VII. Segment IX short. Dorsal plate membranous, rounded distally. Subgenital plate sub-triangular, narrowly rounded apically. Inferior appendages in ventral view trilobed: ventral lobe broad-based, constricted mesally, narrow in distal half; above, two slender processes, the uppermost setate apically. In lateral view, these two dorsal processes can be seen as two lobes of a bifid branch. Parameres slender, overlying each other, inserted laterally. Aedeagus narrow, with an apical twist.

Female. Anterior wing length, 2.3 mm. Antennae 27-segmented. Sternite VIII with apical margin slightly notched medially, a pair of setae on each side of notch.

Immatures unknown.

Distribution: Collected from the type locality only.

Etymology: Named for I. D. Naumann who collected the specimens.

Hellyethira imparalobata sp. nov.

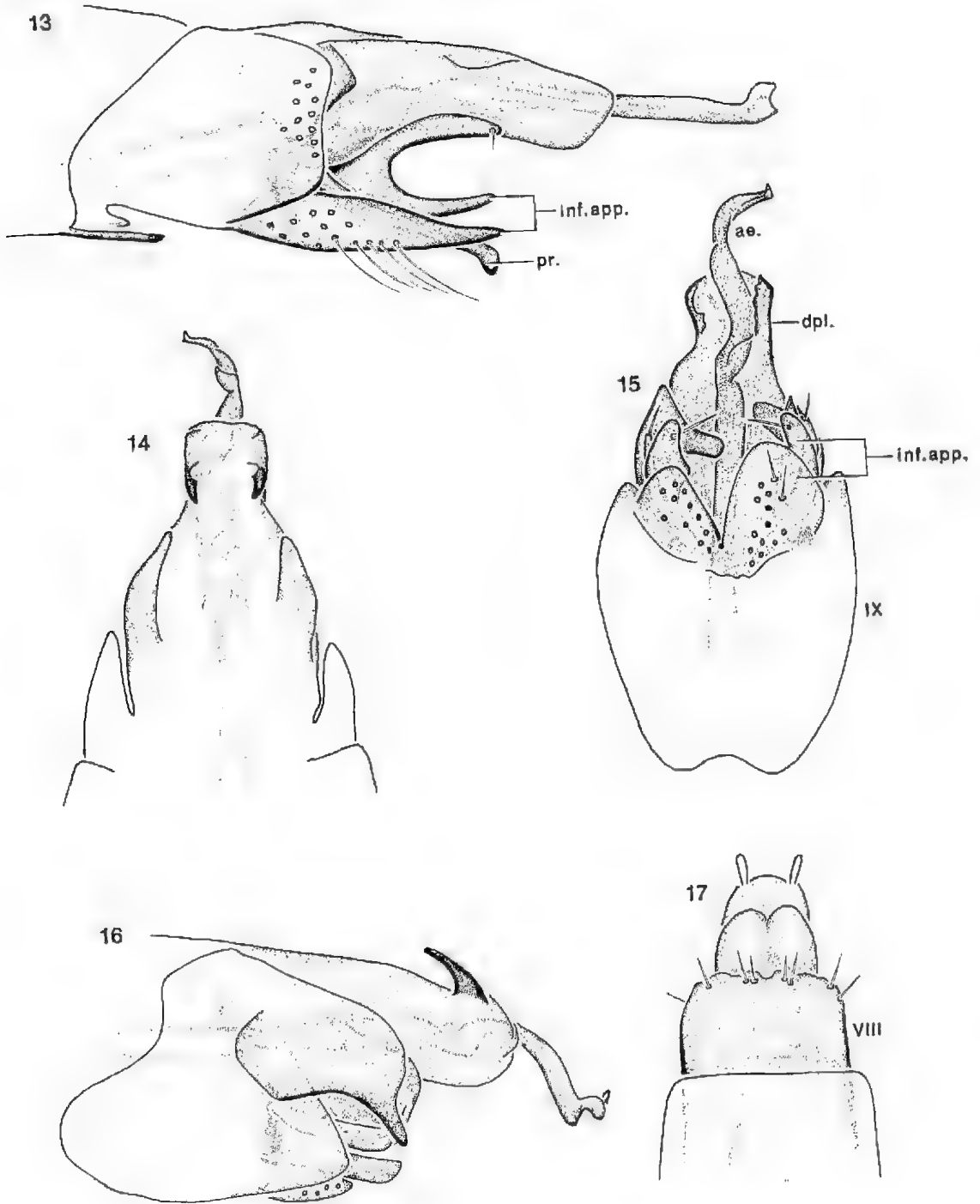
FIGS 14-16

Holotype: NMV, ♂, NE Qld, Yuccabine Creek, 1.1985, R. G. Pearson & L. J. Benson.

Other material examined: NMV, 1 ♂, W.A., Charnley River, 2 km SW of Roly Hill, CALM site 25/2, 16°22'S, 125°12'E, 16-20.vi.88, I. D. Naumann.

Diagnosis: A close sister species to *H. vernoni* Wells, distinguished by asymmetrical inferior appendages and dorsal plate narrowly quadrate in distal half.

Figs 7-12. *Jabirichia dostinei* sp. nov. 7, male genitalia, lateral view. *Orphanotrichia originis* sp. nov. 8,9, male and female genitalia, ventral views. *Hellyethira forficata* sp. nov. 10, male genitalia, ventral view. *Hellyethira radonensis* sp. nov. 11, male genitalia, ventral view. *Hellyethira naumanni* sp. nov. 12, male genitalia, ventral view. Abbreviations: ae., aedeagus; dpl., dorsal plate; inf. app., inferior appendages; lar. l. IX, lateral lobe of segment IX; pr., paramere; VIII, abdominal segment VIII; IX, abdominal segment IX.



Figs 13-17, *Hellyethira naumanni* sp. nov. 13, male genitalia, lateral view. *Hellyethira imparalobata* sp. nov. 14-16, male genitalia, dorsal, ventral and lateral views. *Hellyethira naumanni* sp. nov. 17, female genitalia, ventral view. Abbreviations: ae., aedeagus; dpl., dorsal plate; inf. app., inferior appendages; pr., paramere; VIII, abdominal segment VIII; IX, abdominal segment IX.

Description: Male. Anterior wing length, 1.8 mm. Antennae damaged. Genitalia, Figs 14–16. Abdominal sternite VII with slender, elongate mesal process. Dorsal plate broad-based, in distal half narrowly sub-quadrate with margins dark and paired sclerotised spines laterally. Subgenital plate not evident. Inferior appendages unequal, ventrally with a broad lobe, several narrower processes distally and paired styliform processes laterally. Broad, sclerotised structures laterally above inferior appendages may represent parameres. Aedeagus twisted in distal half.

Female and immatures unknown.

Distribution: Known from the type locality, northeastern Qld., and from Charnley River, northwestern W.A.

Etymology: From the Latin – *impar, lobatus* – unequal, lobed, in reference to the lobes of inferior appendages.

Hellyethira quadrata sp. nov.
FIGS 18–19

Holotype: NMV, ♂, NE Qld., Yuccabine Creek, xii.1985, R. G. Pearson & L. J. Benson.

Paratypes: NMV, same loc. and collectors as holotype: 6 ♂♂, 5 ♀♀ (including allotype), ii.85; 12 ♂♂ v.85; 4 ♂♂, 5 ♀♀ ix.85.

Other material examined: NMV, same loc. and collectors: 11 ♂♂, x.84; 4 ♂♂, xi.84; 8 ♂♂, i.85; 1 ♂, vii.85; 4 ♂♂, ix.85; 1 ♂, xi.85; 1 ♂, i.86; 3 ♂♂, ii.86, 1 ♂, iv.86.

Diagnosis: Most closely resembling *H. ramosa* Wells, but male with inferior appendages wider than long, almost truncate distally, but with a pair of digitiform processes medially.

Description: Males. Anterior wing length, 2.0–2.2 mm. Antennae 31-segmented. Genitalia (Figs 18, 19). A slender, elongate mesal process on sternite VII. Segment IX sub-quadrate. Dorsal plate membranous, rounded distally. Subgenital plate not apparent. Inferior appendages together as wide, in ventral view, as sternite IX, length about half width, inner apical margins produced posteriorly in a small lobe, a setate, digitiform process mesally. Aedeagus with several constrictions distally, hooked apically. Females and immatures unknown.

Distribution: From the type locality only, northeastern Qld.

Etymology: From the Latin – *quadrus* – square, for the general shape of male terminalia.

Hellyethira spinosa sp. nov.
FIGS 20–22

Holotype: NMV, ♂, NE Qld., Yuccabine Creek; R. G. Pearson & L. J. Benson.

Paratypes: NMV, ♂, collected with holotype.

A curious species, originally believed to represent a new genus (Benson & Pearson 1988 – “unidentified genus A”), but here referred to *Hellyethira* with which it conforms in general respects, although the aedeagus more closely resembles those of the new species in *Acritoptila*. *Diagnosis:* Males readily recognised by the array of digitiform processes and irregular spines which replace the more usual genitalic structures; affinities obscure.

Description: Male. Anterior wing length, 1.6–1.8 mm. Antennae 28-segmented. Genitalia, Figs 20–22. Abdominal sternite VII with slender, elongate mesal process. Dorsal plate membranous, rounded apically. Subgenital plate probably represented by the two setate, digitiform processes, fused basally (Fig. 22b). The homologues of a second pair of similar processes (Fig. 22c) are unknown. Inferior appendages (Fig. 22d) broad-based, constricted medially, finger-like distally, with paired apical setae. Parameres forming a set of irregular spines (Fig. 22a). Aedeagus slender, elongate, hooked apically.

Female and immatures unknown.

Distribution: Known only from the type locality, Yuccabine Creek, northeastern Qld.

Etymology: From the Latin – *spina* – thorn, describing the spiny form of the male genitalia.

Acritoptila Wells

Acritoptila Wells, 1982, p. 262; Kelley 1989, p. 190. Type species: *Acritoptila globosa* Wells, by original designation.

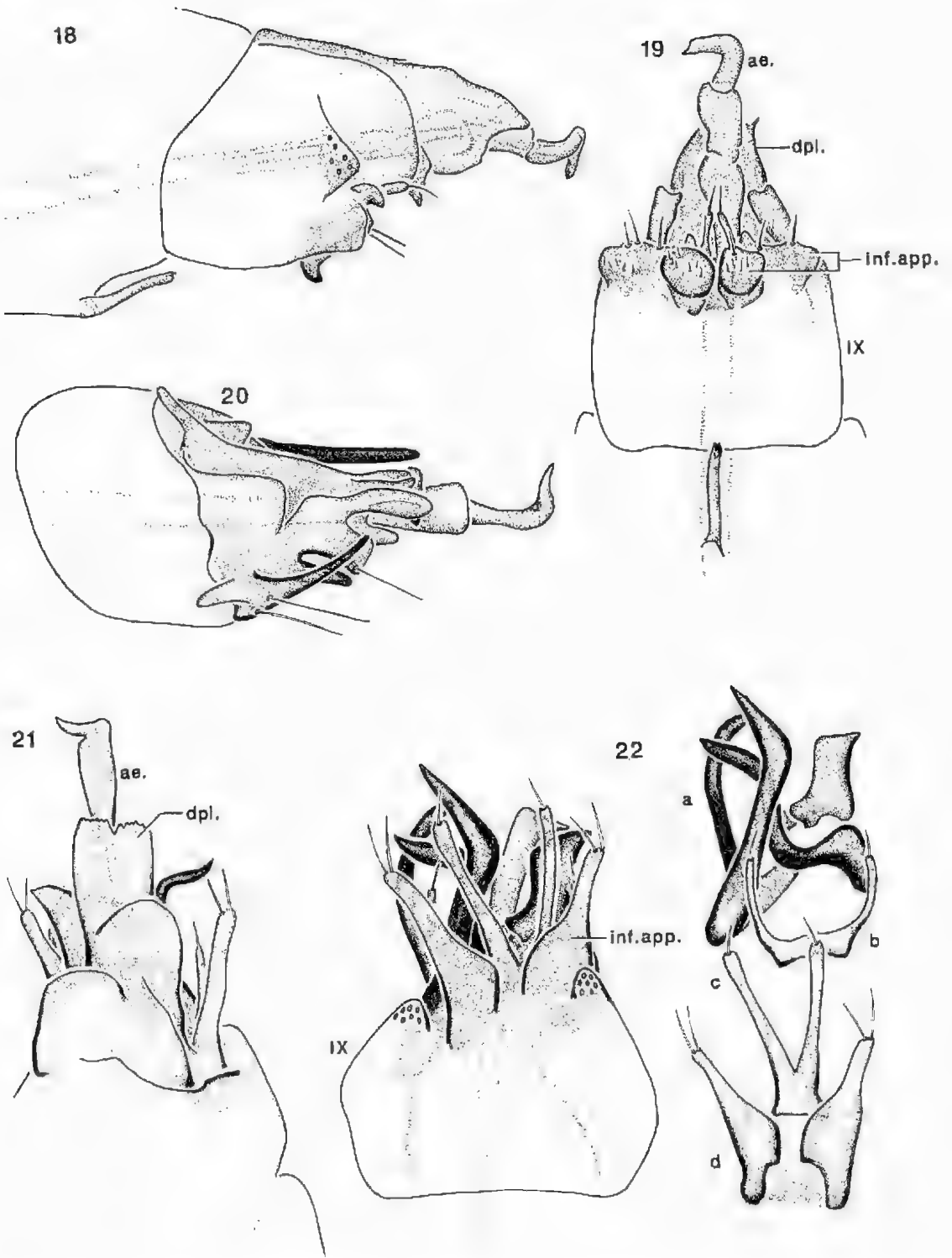
A small genus closely resembling *Hellyethira* in general body features, but with male genitalic structures simpler and tending to be fused. Larvae known for Western Australian species are distinguished from *Hellyethira* by the less pronounced constriction of the first two abdominal segments (Wells 1985b). Two new species from Yuccabine Creek (originally identified as *Hellyethira* sp. C and D for Benson & Pearson 1988) raise Australian representation to five; six are known from New Caledonia (Kelley 1989).

Acritoptila pearsoni sp. nov.
FIGS 23–24

Holotype: NMV, ♂, NE Qld., Yuccabine Creek, iii.1986, R. G. Pearson & L. J. Benson.

Paratypes: NMV, 1 ♂, collected with holotype; NMV, 1 ♂, same loc. and collectors, ii.85.

Diagnosis: Resembling *A. hamata* Wells in the elongate postero-lateral processes on abdominal segment IX and paired spines on lateral margins of dorsal plate, but with distinctive ventral genitalic processes.



Figs 18-22. *Helyethiru quadrata* sp. nov. 18,19, male genitalia, lateral and ventral views. *Helyethira spinosa* sp. nov. 20-22, male genitalia, lateral, dorsal and ventral views. Abbreviations: a, b, c, d, displaced genitalic structures; ae., aedeagus; dpl., dorsal plate; inf. app., inferior appendages; IX, abdominal segment IX.

Description: Male. Anterior wing length, 1.7–1.9 mm. Antennae 37-segmented. Genitalia, Figs 23, 24. Abdominal sternite VIII with a slender, elongate mesal process. Segment IX with setose postero-lateral lobes. Dorsal plate membranous, rounded apically, overlaid by a short, triangular, sclerotised lobe antero-mesally, and bordered by irregular stout, dark spines inflected at right-angles sub-apically. Inferior appendages fused, with a small Y-shaped process apico-mesally, and stout, divergent lobes laterally, each tipped with a hair. A small process dorsal to inferior appendages may represent the subgenital plate. Aedeagus slender mesally, expanded distally, a long, sclerotised spur apically. Female and immatures unknown.

Distribution: Known only from the type locality, northeastern Qld.

Etymology: Named for R. G. Pearson who collected much of the material used in this study.

Acritoptila capistra sp. nov.
FIGS 25–26

Holotype: NMV, ♂, NE Qld, Yuccabine Creek, xi. 1984, R. G. Pearson & L. J. Benson.

Paratypes: NMV, same loc. and collectors: 1 ♂, collected with holotype; 1 ♂, i.85; 1 male, ii.85; 1 male, iii.86; 1 ♂, v. 86.

Diagnosis: Males recognised by the broad, strap-like spines wrapping around the dorsal plate.

Description: Male. Anterior wing length, 1.9–2.2 mm. Antennae 31-segmented. Genitalia, Figs 25, 26. Abdominal sternite VII with a slender, elongate mesal process. Segment IX not produced postero-laterally, although dorso-lateral spines are present, twisting sharply and wrapping around the dorsal plate. Dorsal plate membranous, constricted in basal half, expanded distally, then tapered towards apex. No subgenital plate evident. Inferior appendages fused at bases, forming stout lobes distally. Aedeagus elongate, slender throughout length, slightly hooked sub-apically, apex acute. Females and immatures unknown.

Distribution: Known only from the type locality, northeastern Qld.

Etymology: From the Latin – *capistrum* – halter, to describe the twisting strap-like spines wrapping about the dorsal plate.

Oxyethira Eaton

Oxyethira Eaton, 1873, p. 143; Kelley 1984, p. 435. Type species: *Hydroptila costalis* Curtis sensu Eaton, by original designation.

Trichoglene Neboiss, 1977, p. 43. Type species: *Trichoglene columba* Neboiss, by original designation.

Previously, only two of the 10 subgenera comprising *Oxyethira* (Kelley 1984) were recorded from Australia: the most primitive sub-genus, *O. (Trichoglene)* Neboiss, from the south and east, and a more highly derived group, *O. (Dampftrittichia)* Mosely, from the north. Now a third, *O. (Oxyethira)* Eaton, is added, with the discovery of the Oriental *O. (Oxyethira)* *bogambaru* in the north-east.

Of particular interest is the new species *O. (Trichoglene)* *cornutata* sp. nov. from the Alligator Rivers region, again from the small monsoon forest stream, Radon Springs. Its closest associations are with a New Caledonian species, tending to support the thesis that this stream harbours components of a relictual fauna.

Originally, I considered that the third species reported here, *O. complicata* sp. nov., represented another new genus (Benson & Pearson 1988, "unidentified genus sp. A."). More cautiously, it is now placed in *Oxyethira* with which it shares general features such as shape of wings and venation, antennal form, ocelli 3 and in males titillator present on aedeagus and anterior margin of abdominal segment IX rounded. But it has a tibial spur formula of 0,2,4, which occurs only in members of the *minima* group in *O. (Dampftrittichia)* and, in the male, abdominal segment IX not retracted in VIII and genitalic structures highly asymmetric. It is not assigned to any sub-genus. I am unaware of any other *Oxyethira* species with highly asymmetrical genitalia – a state which is usually considered to be derived.

Oxyethira (Oxyethira) bogambara Schmid

Oxyethira bogambara Schmid, 1958, p. 67.

Holotype: male, Ceylon, Kandapola, USNM.

New Records: NMV: 1 ♂, NE Qld, Yuccabine Creek, x.84, Benson & Pearson; 1 ♂, same loc., 10.iv.85; 2 ♂♂, 2 ♀♀, same loc., v.85; 1 ♂, same loc., i.86; 1 ♂, same loc., i.86.

In the Oriental *ramosa* group, *O. (Oxyethira)* (Kelley 1984), and, like *Oxyethira incana* Ulmer, probably a species that has dispersed recently to Australia via New Guinea.

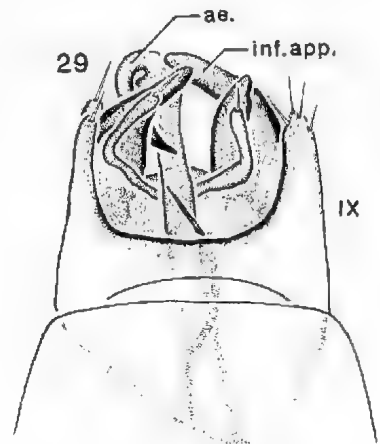
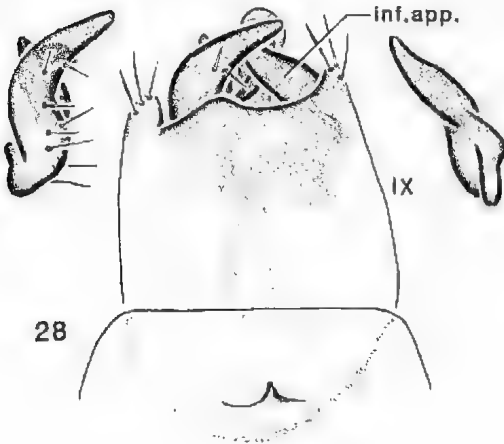
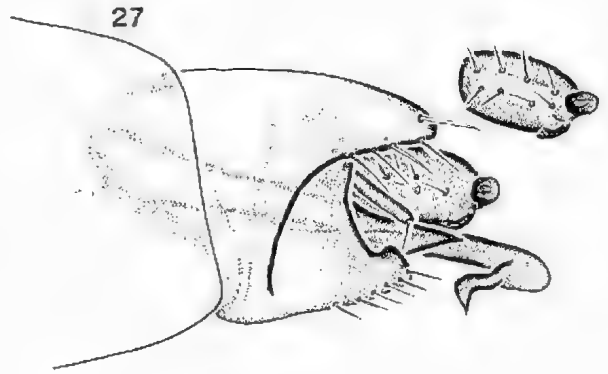
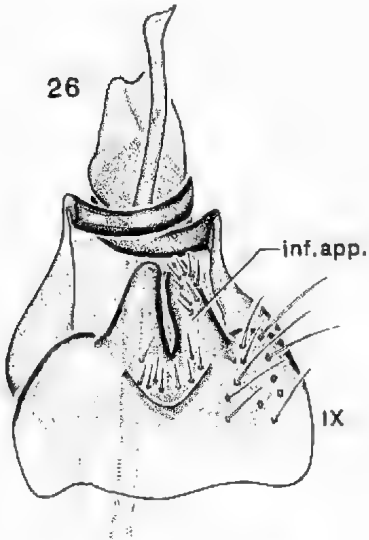
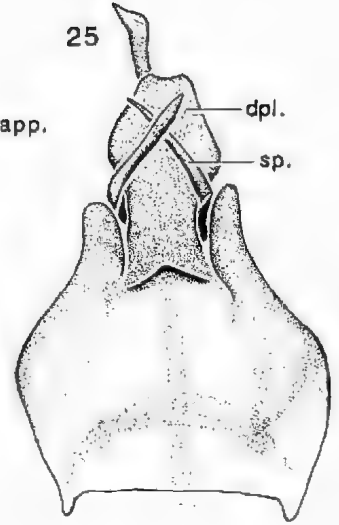
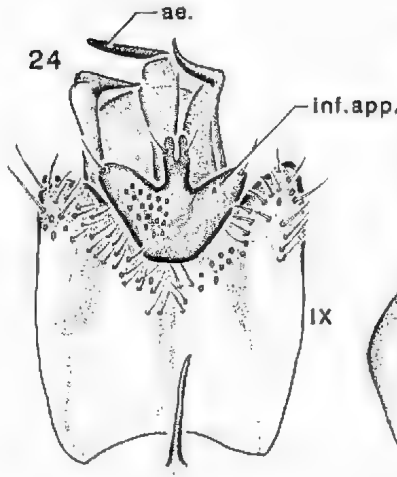
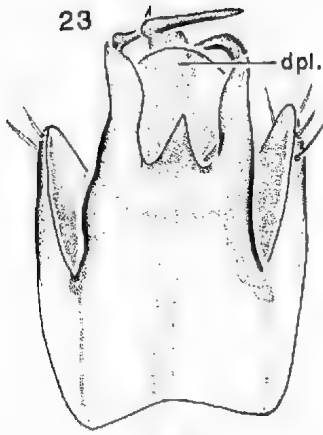
Males readily recognised by the titillator twisted 2 to 3 times around the aedeagus (Schmid 1958). females by the stout terminalia and V-shaped structure on sternite VIII (Wells & Dudgeon 1990).

Distribution: S.E. Asia, New Guinea, northern Aust.

Oxyethira complicata sp. nov.

FIGS 27–29

Originally designated "New genus sp. B" for Benson & Pearson (1988) this unusual species is now placed tentatively in *Oxyethira*, but left in *incertae*



sedis, as it cannot be assigned to any of the existing sub-genera.

Holotype: NMV, ♂, NE Qld. Yuccabine Creek, li.1986, R. G. Pearson & L. J. Benson.

Paratypes, NMV, same loc. and collectors as holotype, 2 ♂♂, collected with holotype, 1 ♂, xii.85; 1 ♂, iv.86.

Diagnosis: Males recognised by the combination of presence of ocelli, spur formula 0,2,4, and highly asymmetric genitalic appendages.

Description: Male. Anterior wing length, 1.7–1.8 mm. Antennae 27-segmented, flagellar segments with abundant *sensilla auriculica*. Genitalia, Figs 27–29. Abdominal segment VII with a small acute spur apico-mesally. Segment IX well protruded from VIII, anterior margin broadly rounded, postero-lateral lobes rounded distally; sternite with apical margin deeply excavated. Subgenital plate not evident. Inferior appendages asymmetrical, sclerotised, complexly multilobed, with paired, irregularly-twisted, setate, digitiform processes dorsally; Aedeagus straight, with a slender titillator, and strongly recurved apical spine.

Female and immatures unknown.

Distribution: Known only from the type locality, northeastern Qld.

Etymology: From the Latin – *complicatus* – complicated, for the genitalic structures that defy interpretation.

Oxyethira (Trichoglene) cornutata sp. nov.

FIGS 30–31

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 14.iv.1989, A. Wells & P. Suter.

Diagnosis: Referred to *O. (Trichoglene)* and most closely resembling the New Caledonian *O. insularis* Kelley (1989) with which it shares the form of the inferior appendages, but also showing some resemblance to *O. brevis* Wells from SW W. Aust., and *O. caledonensis* Kelley from New Caledonia.

Description: Male. Uniformly dark grey. Anterior wing length, 1.3 mm. Antennae 26-segmented, with alternating bands of light and dark segments. Genitalia, Figs 30, 31. Abdominal segment IX narrow, elongate, anterior margin rounded, reaching into segment VII. Dorsal plate short, rounded, with a sclerotised process on each side. Subgenital plate membranous, divided into two lobes by rounded median excision. Bilobed process slightly longer

than other genitalic parts. Inferior appendages forming a pair of widely divergent arms. Aedeagus broadly hooked apically.

Female and immatures unknown.

Distribution: Known only from one male from a small monsoon forest stream, Kakadu National Park, N.T.

Etymology: From the Latin – *cornutus* – horn-like, describing the form of the inferior appendages.

Orthotrichia Eaton

Orthotrichia Eaton, 1873, p. 141. Type species: *Hydropitula angustella* McLachlan, by original designation.

Eight new species referred to *Orthotrichia* raise to 43 the Australian representation. Four are in the *gracilis* group (Wells 1979c), three in the more diverse *adornata/kokodana* group (Wells 1984), and one in the *aberrans* group. Additional records of established species extend their distributions, and cases of several of these are figured.

Orthotrichia annica sp. nov.

FIGS 32–33, 47

Holotype: NTM, ♂, N.T., Kambolgie Creek, 13°32'S, 132°23'E, 25.v.1988, J.A. Tr., A. Wells & P. Suter.

Paratypes: NTM, NMV, 6 ♂♂, same loc. as holotype, 25.v.88, UV Lt, Suter & Wells.

Other material examined: NTM, pupae, same loc. as holotype, 25.v.88, Wells; NTM, ♂ pupa and cases, N.T., South Alligator River at Gimbat OSS Station, 13°35'S, 132°36'E, Wells.

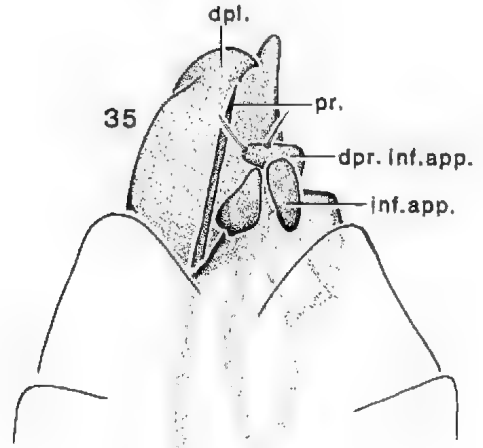
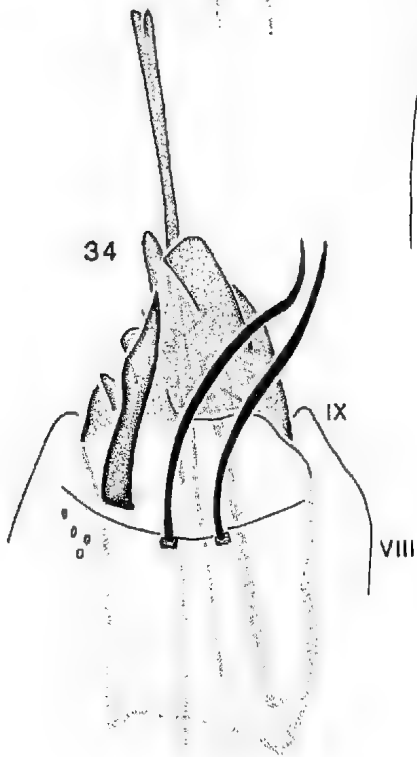
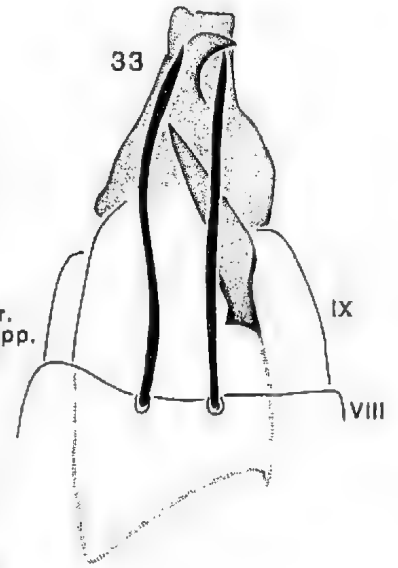
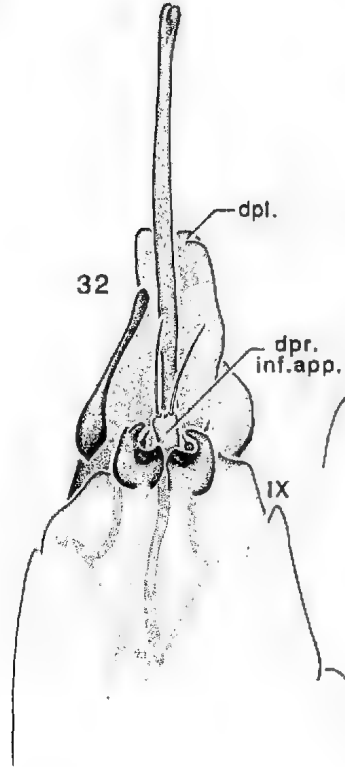
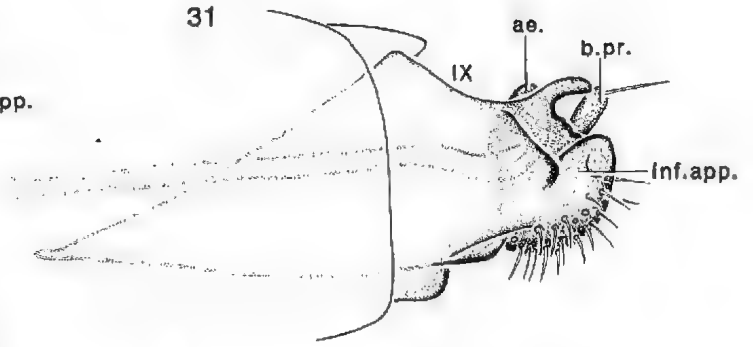
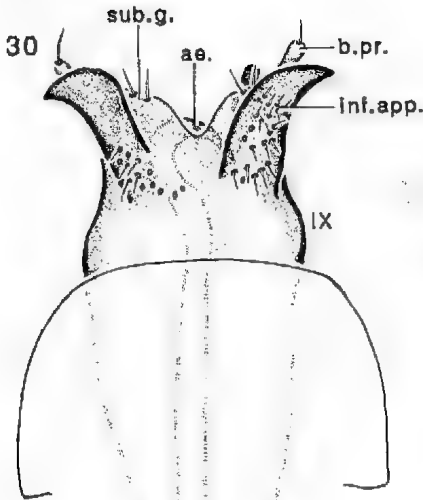
Diagnosis: In the *gracilis* group and closely resembling *O. kholoensis* Wells and *O. paranga* Wells from which it differs in shape of inferior appendages and presence of a small, pale spur distally on dorsal plate.

Description: Male. Anterior wing length, 1.7 mm. Antennae 26-segmented. Genitalia, Figs 32, 33. Tergite VIII with a pair of strong, black, spiny setae on apico-mesal margin. Tergite IX with left lateral spine broad, blade-like. Dorsal plate elongate, membranous except for left ventral margin; a small laterally-directed spur distally; apex truncate, about one third width of base. Inferior appendages in ventral view with a concavity apico-mesally; dorsal process slender, undivided.

Female unknown.

Figs 23–29, *Acritoptila pearsoni* sp. nov. 23,24, male genitalia, dorsal and ventral views. *Acritoptila capistra* sp. nov. 25,26, male genitalia, dorsal and ventral views. *Oxyethira complicata* sp. nov. 27–29, male genitalia, lateral, ventral and dorsal views.

Abbreviations: ae., aedeagus; dpl., dorsal plate; inf. app., inferior appendages; sp., spine; IX, abdominal segment IX.



Pupal case (Fig. 47). Of characteristic form, dark with short ribs dorsally.

Distribution: Collected from the upper reaches of the South Alligator River, and one of its small tributaries, N.T.

Etymology: From the Latin – *umnicus* – of a stream, pertaining to type locality, a small stream.

Orthotrichia fontinalis sp. nov.

FIGS 34–35

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 18–19.v.1988, Lt Tr., P. Suter & A. Wells.

Paratypes: NTM, NMV, 10 ♂♂, collected with holotype; NMV, 1 ♂, same loc., 13–14.iv.89, Wells & Suter; NTM, 1 ♂, N.T., Kakadu National Park, Bowerbird Billabong, 12°47'S, 133°02'E, 1.x.88, Dostine.

Diagnosis: Another *gracilis* group member, with male genitalia similar to *O. attenuata* Wells but distinguished by asymmetry of inferior appendages and their dorsal process.

Description: Male. Anterior wing length, 1.2 mm. Antennae 24-segmented. Genitalia, Figs 34, 35. Paired, black, spiny setae apicomesally on tergite VIII. Right dorsal spine only on tergite IX. Dorsal plate irregularly bilobed distally, left lobe slightly hooked apically. Paramere elongate, slender. Inferior appendages asymmetrical; in ventral view, separated basally, converging distally, left subtriangular, right almost ovoid; dorsal process undivided, arising on right, curving to left. Female and immatures unknown.

Distribution: Known only from two localities in Kakadu National Park, N.T.

Etymology: From the Latin – *fontinalis* – of a spring, pertaining to the collecting site.

Orthotrichia tomentosa sp. nov.

FIGS 36–37

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, Lt Tr., 18–19.iv.1988, P. Suter & A. Wells.

Paratypes: N.T.: NTM, NMV, 6 ♂♂, collected with holotype; 1 ♂, Gulungul Creek at inlet to Gulungul Billabong, 20.iv.89, Wells & Suter.

Diagnosis: In the *gracilis* group, with males closely resembling *O. aculeata* in form of inferior appendages and their dorsal process but distinguished by the dark, curved spine to the left of the dorsal plate.

Description: Anterior wing length, 1.5 mm. Antennae damaged. Genitalia (Figs 36, 37). A pair of stout black, spinose setae offset from posterior margin of tergite VIII. Abdominal segment IX with obliquely truncate anterior margin, a strongly curved, dark spine arising apically on left and pressing against dorsal plate. Dorsal plate narrowly rounded apically. Inferior appendages ovoid, setose, separated at bases, converging apically; process of inferior appendages short, undivided, lying on right, Paramere slender, elongate.

Female and immatures unknown.

Distribution: Collected from two sites in Kakadu National Park, N.T.

Etymology: From the Latin – *tomentum* – hairy, describing the appearance of the inferior appendages.

Orthotrichia serrata sp. nov.

FIGS 39–40

Holotype: NTM, ♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, Lt Tr., 18–19.v.1988, P. Suter & A. Wells.

Paratype: NTM, 1 ♂, same data as holotype.

Diagnosis: A *gracilis* group member, with close similarities to *O. paranga*, but differing in the shape of inferior appendages and their process, and the irregular-shaped sclerotised spine along left of dorsal plate.

Description: Male. Anterior wing length, 1.5 mm. Antennae damaged. Genitalia, Figs 39, 40. Paired black spiny setae subapical on tergite VIII. Right lateral spine on segment IX blade-like, left irregular in shape, broad in proximal $\frac{2}{3}$, slender distally, apex slightly expanded. Dorsal plate about same width throughout length. Inferior appendages discrete, inner margins dark, toothed; dorsal process asymmetric, slender, arising on right, arching towards left. Paramere slender, elongate. Female and immatures unknown.

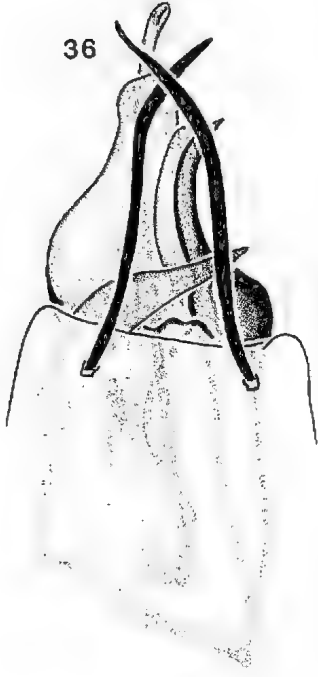
Distribution: Known only from the type locality, Kakadu National Park, N.T.

Etymology: From the Latin – *serratus* – notched, to describe the inner margin of inferior appendages.

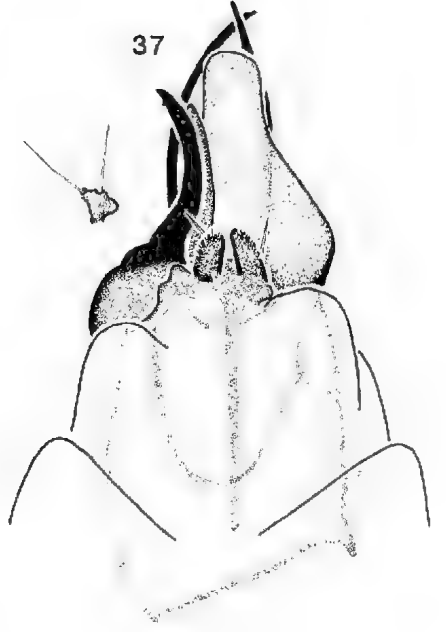
Figs 30–35. *Oxyethira cornutata* sp. nov. 30,31, male genitalia, ventral and lateral views. *Orthotrichia amica* sp. nov. 32,33, male genitalia, ventral and dorsal views. *Orthotrichia fontinalis* sp. nov. 34,35, male genitalia, dorsal and ventral views.

Abbreviations: ac., aedeagus; b.pr., bilobed process; dpr. inf. app., dorsal process of inferior appendages; dpl., dorsal plate; inf. app., inferior appendages; pr., paramere; sub.g., subgenital plate; VIII, abdominal segment VIII; IX, abdominal segment IX.

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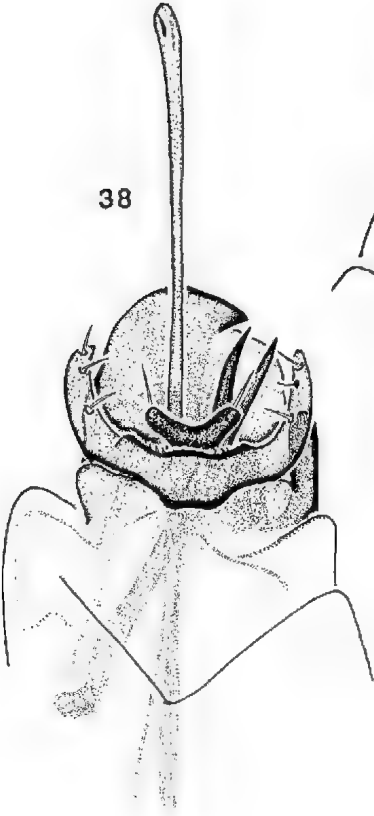
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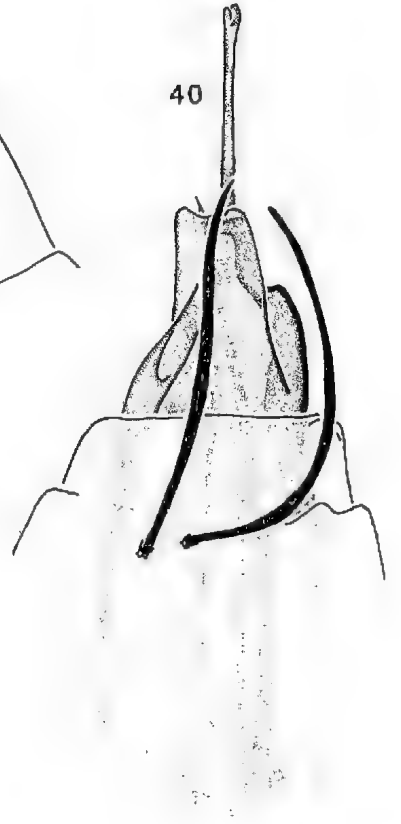
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Orthotrichia paranga Wells
FIG. 46

Orthotrichia paranga Wells, 1979c, p. 614.

Holotype: ♂, W.A., Ord River Dam, 21.ii.1977, WAM.

New records, N.T.: NTM, 1 ♂, Magela Creek at Rum Pipe, 17.ii.88, Dostine; NTM, 1 ♂, Kambolgie Creek, 13°32'S, 132°23'E, Lt Tr., 25-26.v.88, Wells & Suter; 1 ♂ pupa and case, Fisher Creek above South Alligator River junction, 13°34'S, 132°34'E, Wells & Suter, OSS voucher set.

Originally described from NW W.Aust., *O. paranga* closely resembles *O. stipa* Wells, *O. kholoensis* Wells and *O. fontinalis*, but differs in shape of inferior appendages and their dorsal process. The pupa has been associated.

Pupal case (Fig. 46). Length, 2.2 mm. Darkly pigmented, dorso-ventrally flattened, with finely serrate ribs extending full length.

Distribution: Eastern Qld, northern N.T.

Orthotrichia tyleri Wells
FIGS 51-52

Orthotrichia tyleri Wells, 1979c, p. 617.

Holotype: ♂, W. Aust., Mitchell Plateau, Camp Creek, 20.vii.1978, WAM.

New records: Cased pupae, N.T., Yellowwaters Billabong, 21.v.88, Dostine, OSS voucher set.

Males are distinguished by widely separated, strong, black, spiny setae on abdominal tergite VIII; a *gracilis* group member.

Pupal case (Figs 51, 52). Length, 2.4 mm. Pale, transparent; long, slender, tapering at each end, without ribs, a pair of vents opening on the dorsal margin as in *O. turrita* Wells (Wells 1985b).

Distribution: Northwestern W.A., northern N.T. This is a common species in lentic and lotic systems; immatures collected from stems of an aquatic macrophyte, *Hydrilla* sp.

Orthotrichia furcata sp. nov.
FIG. 38

Holotype: NTM, ♂, N.T., South Alligator River above Fisher Creek junction, Lt Tr., 19-20.iv.1989, P. Suter & A. Wells.

Paratype: NTM, 1 ♂, N.T., Kakadu National Park, Magela Creek at outlet to Bowerbird Billabong, 1.v.88, Dostine.

Diagnosis: An *adornata* group species with elongate inferior appendages fused medially, and paramere bifid apically.

Description: Male. Anterior wing length, 2.1-2.3 mm. Antennae 27-segmented. Genitalia, Fig. 38. Abdominal sternite VIII with brush of blunt, black setae mesally. Segment IX short. Dorsal plate broad, rounded apically, a small spur on margin. Inferior appendages elongate, widely separated distally, bases fused; dorsal process Y-shaped. Paramere stout, dark, distally bifid, apices acute. Female and immatures unknown.

Distribution: Known only from two localities, Kakadu National Park, N.T.

Etymology: From the Latin -*furcatus* - forked, to describe the forked paramere.

Orthotrichia alata sp. nov.
FIGS 41-42, 48-49

Holotype: NTM, ♂, N.T., Kambolgie Creek, 13°32'S, 132°23'E, Lt Tr., 25-26.v.1988, A. Wells & P. Suter.

Paratypes: NTM, 2 ♂♂, N.T., Kakadu National Park, Radon Springs, 12°45'S, 132°55'E, 18-19.v.88, Suter & Wells; NMV, 5 ♂♂, same loc., 13-14.iv.89, Suter & Wells; NTM, 1 ♂, South Alligator River, Gimbat Station, 26.iv.88, Dostine; NTM, 10 ♂♂, Graveside Creek, 18.vii.88, Dostine; NMV, 1 ♂, Creek 5 km W of OSS Gimbat station, 19.iv.89, Wells & Suter.

Other material examined: NTM, NMV, larvae, pupae, cases, N.T., Kakadu National Park, Baroalba Springs, 12°49'S, 132°52'E 22.v.88, Wells & Suter; NTM, immatures, South Alligator River, numerous records, Dostine.

Diagnosis: In the *adornata* group; males with irregular and strongly asymmetric inferior appendages resembling those of *O. tyleri* Wells; cases recognised by distinctive lateral flanges.

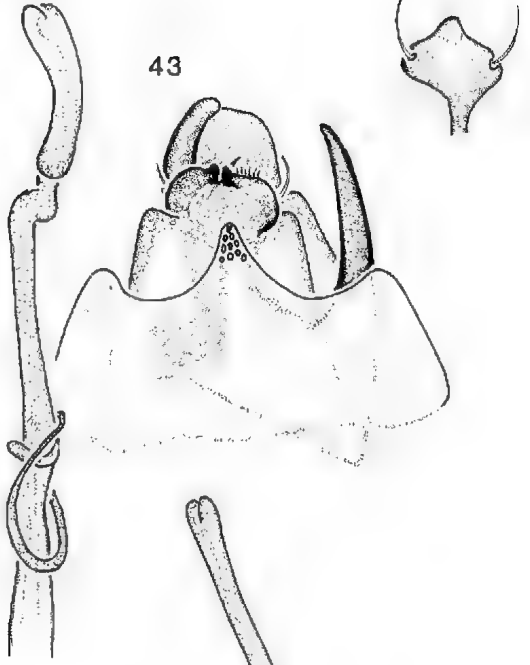
Description: Male. Anterior wing length, 1.7 mm. Antennae 25-segmented. Genitalia, Figs 41, 42. Tergite VIII without black setae. Sternite IX rounded anteriorly; tergite with right lateral spine only, stout, curving towards left distally. Dorsal plate irregularly rounded apically, a deep notch in right lateral margin, sclerotised spur subapically. Inferior appendages comprised of irregular lobes, sclerotised distally; dorsal process small, slightly divided subapically, lobes divergent.

Female unknown.

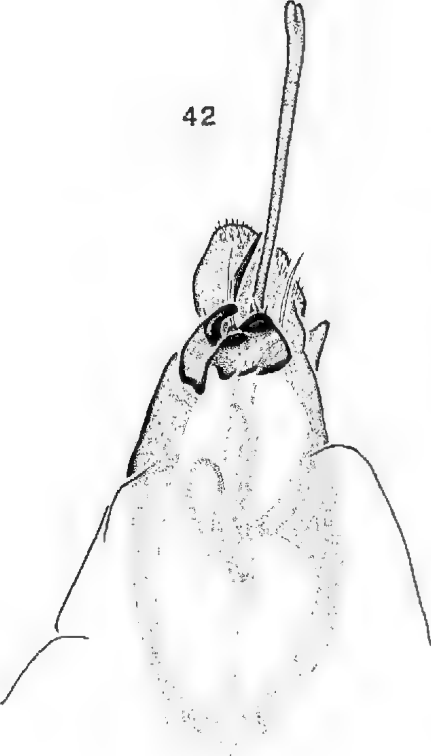
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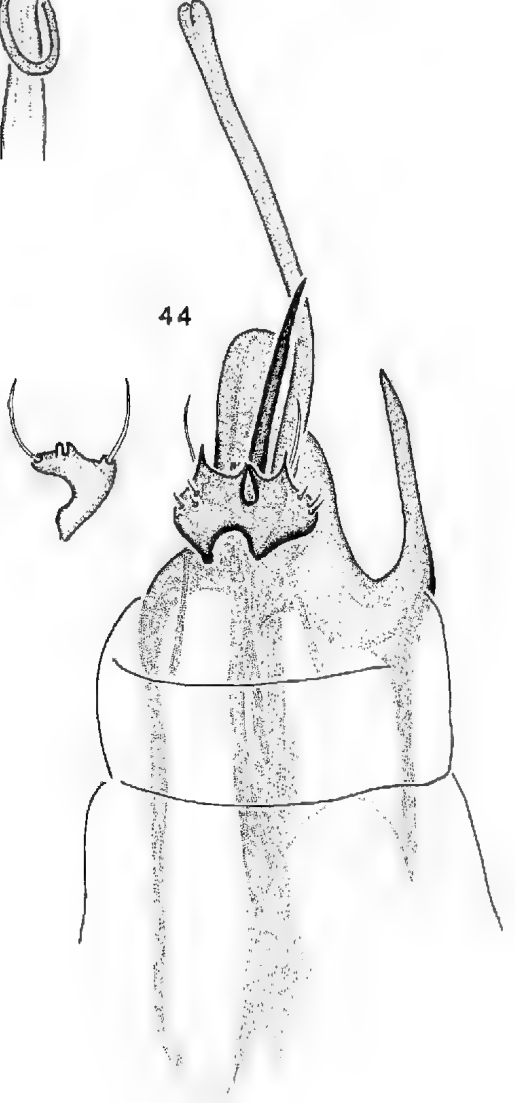
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Larval and pupal cases (Figs 48, 49). Length of pupal case, 1.8–2.1 mm. Black, without usual dorsal ribs but with lateral margins expanded and raised to form "wings" or flanges, a furrow mid-dorsally. *Distribution*: Alligator Rivers region, N.T., where it occurs in small streams on the edge of the escarpment and in the higher reaches of the South Alligator River.

Etymology: The Latin – *alatus* – furnished with wings, describing the flanges on the cases.

Orthotrichia scutata Wells

FIG. 55

Orthotrichia scutata Wells, 1979c, p. 599.

Holotype: ♂, W. Aust., Spillway Creek, Ord River Dam, 20.ii.1977, WAM.

New Records, N.T.: NTM, 1 ♂, South Alligator River at Gimbat OSS Station, 13°35'S, 132°36'E. 28.iv.88, Dostine; NTM, larvae, pupae, same loc., 24.v.88, Wells & Suter.

In samples of congeners, *O. scutata* can be recognised by its large size and dark colour; males have right lateral spine on abdominal tergite IX broadly bilobed and visible in ventral view as a "bract" about the left margin of the dorsal plate. *Larval and pupal cases*. Pupal case length, 2.3–2.7 mm. Case (Fig. 55) dark brown, larger than other *Orthotrichia* except *uberrans* group members, relatively stout, with short ribs dorso-mesally, pupal case with posterior end longer than anterior end. *Distribution*: Northwestern W.A., northern N.T. Immatures collected from undersides of rocks in flowing water.

Orthotrichia bensoni sp. nov.

FIG. 44

Holotype: NMV, ♂, NE Qld, Yuccabine Creek, xi.1984, L. J. Benson & R. G. Pearson.

Paratypes: NMV, 3 ♂♂, same loc. and collectors, ii.85.

Diagnosis: In the *adornata* group, and distinguished by the slender lateral spine projecting posteriorly on the right side, well away from other genitalic structures.

Description: Male. Anterior wing length, 1.4–1.6 mm. Antennae 22-segmented. Genitalia, Fig. 44. Abdominal segment IX rounded distally, with a strong, dark, slender right lateral spine. Dorsal plate in form of two stout spines, one 2x length of other, each with apex curving inwards. Inferior appendages rounded laterally, fused basally, divided distally, with slender tapered projections apico-laterally; dorsal process asymmetrical, arching from

right to left, left arm produced and notched. Paramere elongate.

Female and immatures unknown.

Distribution: Northeastern Qld, Yuccabine Creek. *Etymology*: Named for one of the collectors, L. J. Benson.

Orthotrichia suteri Wells

FIGS 54, 56

Orthotrichia suteri Wells, 1979c, p. 605.

Holotype: ♂, W. Aust., Mitchell Plateau, Camp Creek, 3.vii.1978, WAM.

New Records, N.T.: NTM: Jabiru, Ranger Retention Pond 1, 16.iv.89, A. Wells.

A tiny caddisfly described from northwestern W.A., male recognised by long, widely divergent lobes on the dorsal process of inferior appendages. *Larval and pupal cases* (Figs 54, 56). Small slender, transparent, without ribs, larval case tubular, pupal case bluntly rounded anteriorly, tapered posteriorly. *Distribution*: Northwestern W.A., northern N.T. Collected from beneath *Nymphæa* and *Nymphoides* leaves in still water.

Orthotrichia velata Wells

FIG. 50

Orthotrichia velata Wells 1983, p. 641.

Holotype: ♂, Qld, Upper Ross River, below weir, 8.v.1979, NMV.

New Records, N.T.: NTM: 1 ♂, Magela Creek at Mudginberri Billabong inlet, 18.v.88, Wells & Suter; 4 ♂♂, Radon Springs, 18–19.v.88, Suter & Wells; 9 ♂♂, same data, 14.iv.89; 2 ♂♂, Magela Creek at Ranger outlet pipe, 20.v.88; 8 ♂♂, pupae, South Alligator River at Fisher Creek confluence, 24.v.88, Wells & Suter; 7 ♂♂, same data, 19–20.iv.89; 5 ♂♂, South Alligator River at Gimbat Station, 28.v.88, Dostine.

Male of this species can be recognised by the broad, sheathing dorsal plate with V-shaped apico-ventral excision, larvae by the spines on the anal prolegs. The pupal case is figured for the first time. *Pupal case* (Fig. 50). Length, 1.4–1.9 mm, rounded, with short medial ribs, grey.

Distribution: Northern Australia.

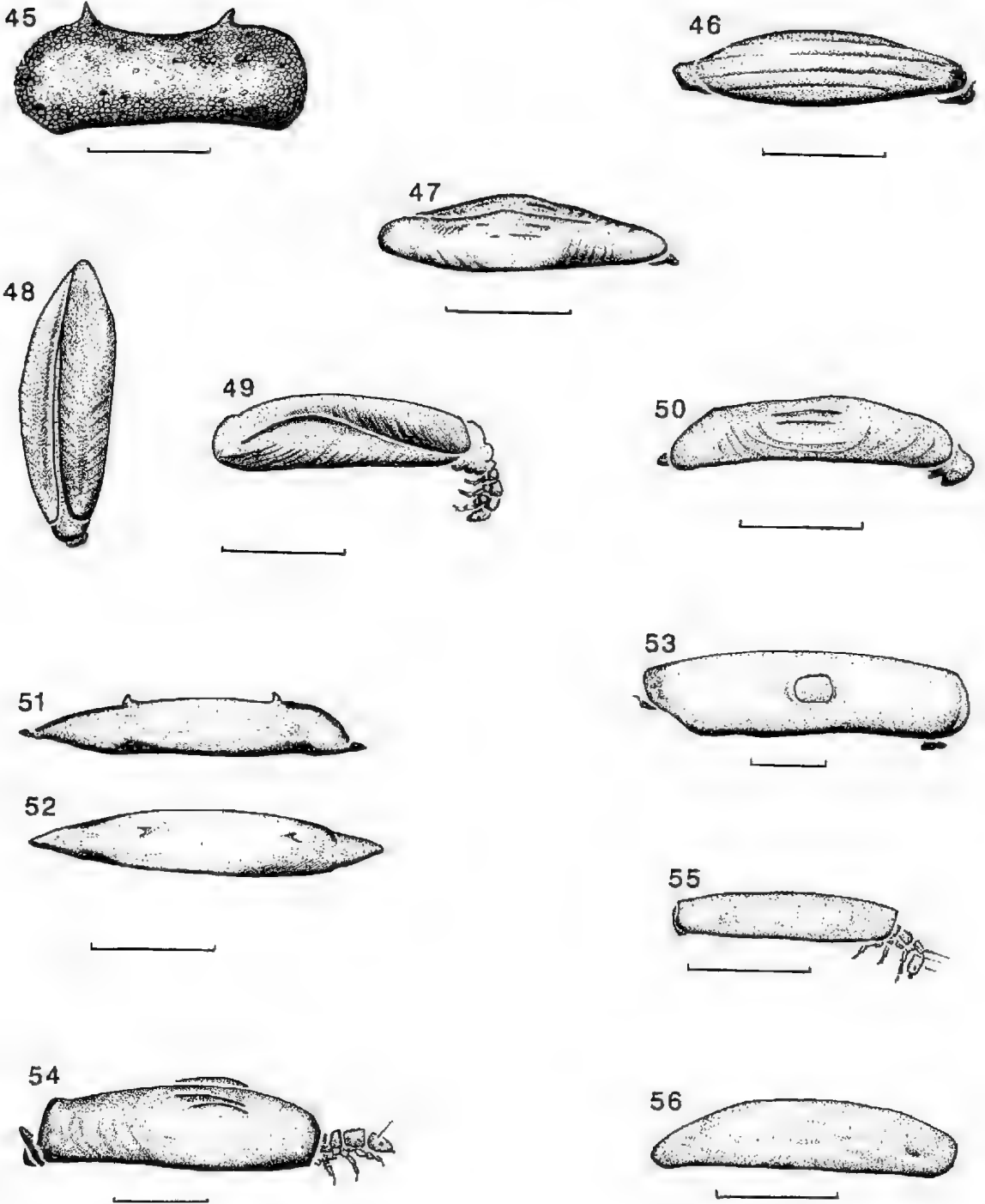
Orthotrichia muscari Wells

FIG. 53

Orthotrichia muscari Wells, 1983, p. 638.

Holotype: ♂, Qld, Iron range, Middle Claudie River, 2–9.x.1974, NMV.

New Records, N.T.: NTM, 1 ♂, 1 ♀, Radon Springs, 14.iv.89, Suter & Wells; 1 ♂ pupa and case, Kakadu National Park, Baroalba Springs, 12°49'S,



Figs 45-56. *Hellyethira forficata* sp. nov. 45, larval case. *Orthotrichia paranga* Wells. 46, pupal case. *Orthotrichia amnica* sp. nov. 47, pupal case. *Orthotrichia alata* sp. nov. 48, 49, larval and pupal cases. *Orthotrichia velata* Wells. 50, pupal case. *Orthotrichia tyleri* Wells. 51, 52, pupal case, lateral and dorsal views. *Orthotrichia muscari* Wells. 53, pupal case. *Orthotrichia scutata* Wells, 54, larva and case. *Orthotrichia suteri* Wells. 55, 56, larval and pupal cases. Scale bars = 1 mm.

132°52' E, 22.v.88, Wells & Suter, OSS voucher set; 1 larva, 1 pupa, Magela Creek below falls, 21.iv.89, Wells & Suter; 1 pupa, Baroalba Creek, 17.iv.89 Suter & Wells.

An unusual member of the *aberrans* group of large hydroptilids, with elongate inferior appendages and a brush-like structure arising above the right inferior appendage. Several cased pupae have been collected and conform with others in the group.

Pupa and case. Pupal case length, 4.6 mm. Case large, smooth, transparent, constructed of secretion. In one specimen, one of the two tiny valves of the early final instar larva is incorporated into the later stage case (Fig. 53), others lack the small valves. Pupal cases are covered loosely with coarse sand; pupal hook plates with only one large hook each; anterior margin of the head is produced as in other members of the group (Wells 1985b).

Distribution: Northeastern Qld, northern N.T. Pupae were collected from undersides of rocks in a small, spring-fed stream at the foot of the Kakadu Escarpment.

Orthotrichia constricta sp. nov.

FIG. 43

Holotype: NMV, ♂, NE Qld, Yuccabine Creek, i. 1985, R. G. Pearson & L. J. Benson.

Diagnosis: A new *aberrans* group species, distinguished by the form of its inferior appendages and their dorsal process, and by the narrow sub-apical constriction on the aedeagus which results in a sharp twist at about $\frac{1}{4}$ length.

Description: Male. Anterior wing length, 2.6 mm. Antennae 28-segmented. Genitalia, Fig. 43. Abdominal segment VIII short, broad, sternite produced apico-mesally to form a triangular lobe, tipped with blunt setae. Segment IX narrow, laterally on right produced posteriorly to form a stout spine. Dorsal plate membranous, a broad, blunt, marginal spine on left. Inferior appendages fused, bulbous, slightly cleft mesally; dorsal process undivided, irregular in shape, slightly produced apico-mesally. Aedeagus elongate, tightly constricted and twisted at about $\frac{1}{4}$ length. Paramere a short, twisted spine. Female and immatures unknown.

Distribution: Known only from the type locality, northeastern Qld.

Etymology: From the Latin - *constrictus* - contracted, describing the shape of the aedeagus.

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